41 **Jenny is solving the equation $x^2 - 8x = 9$ by completing the square. What number should be added to both sides of the equation to complete the square?**

A 2

B 4

C 8

D 16

CST00508

42 **Two consecutive positive integers have the property that one integer times twice the other equals 612. What is the sum of these two integers?**

A 33

B 35

C 37

D 39

CST00206

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43 **What are the solutions to the equation $x^2 - 6x + 5 = -8$?**

A 2 and 3

B $2i$ and $3i$

C $3 + 2 \cdot 3$ and $3 - 2 \cdot 3$

D $3 + 2i$ and $3 - 2i$

CST20325

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44 **Which of the following *most* accurately describes the translation of the graph $y = (x + 3)^2 - 2$ to the graph of $y = (x - 2)^2 + 2$?**

A up 4 and 5 to the right

B down 2 and 2 to the right

C down 2 and 3 to the left

D up 4 and 2 to the left

CST10074

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45 **Which of the following sentences is true about the graphs of $y = 3(x - 5)^2 + 1$ and $y = 3(x + 5)^2 + 1$?**

A Their vertices are maximums.

B The graphs have the same shape with different vertices.

C The graphs have different shapes with different vertices.

D One graph has a vertex that is a maximum, while the other graph has a vertex that is a minimum.

CST10294

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46 **What are the x-intercepts of the graph of $y = 12x^2 - 5x - 2$?**

A 1 and $-\frac{1}{6}$

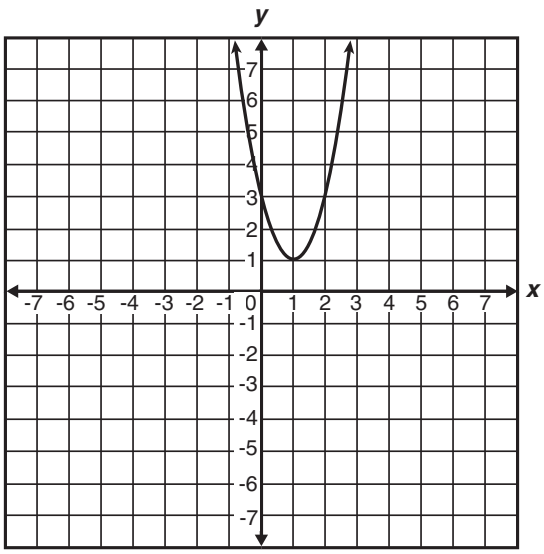
B -1 and $\frac{1}{6}$

C $\frac{2}{3}$ and $-\frac{1}{4}$

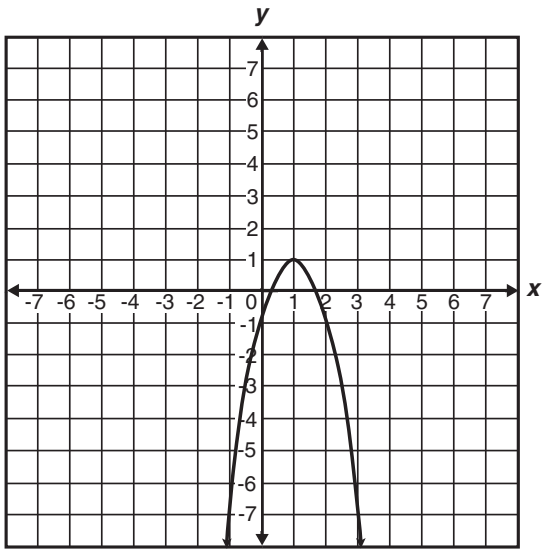
D $-\frac{2}{3}$ and $\frac{1}{4}$

CST00297

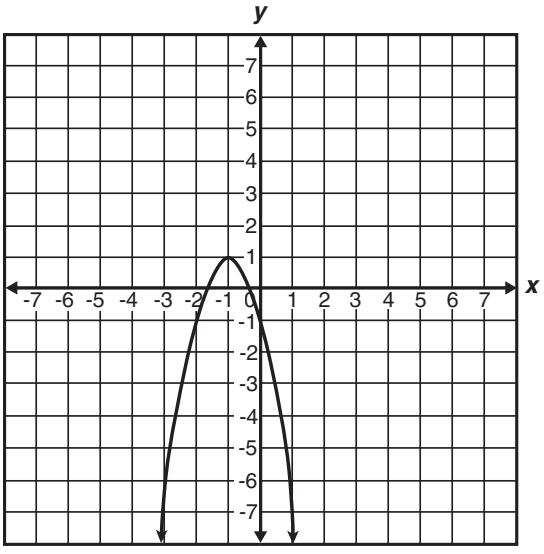
47 **Which is the graph of $y = -2(x-1)^2 + 1$?**



A



C



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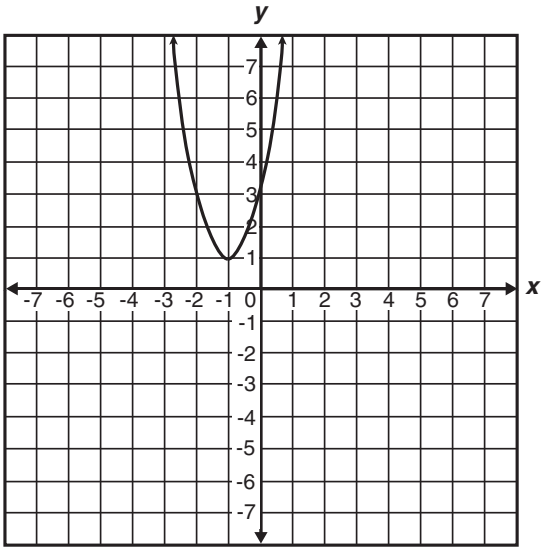

D

CST10292

48 **Which ordered pair is the vertex of $f(x) = x^2 + 6x + 5$?**

A $(-3, -4)$

B $(-2, -3)$

C $(-1, 0)$

D $(0, -5)$

CST10084

49 **The graph of $\left(\frac{x}{2}\right)^2 - \left(\frac{y}{3}\right)^2 = 1$ is a hyperbola. Which set of equations represents the asymptotes of the hyperbola's graph?**

A $y = \frac{3}{2}x, y = -\frac{3}{2}x$

B $y = \frac{2}{3}x, y = -\frac{2}{3}x$

C $y = \frac{1}{2}x, y = -\frac{1}{2}x$

D $y = \frac{1}{3}x, y = -\frac{1}{3}x$

CST10304

50 **Which of the following represents a parabola?**

A $x^2 + y^2 = r^2$

B $\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$

C $4px = y^2$

D $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$

CST20065

51 $$4x^2 - 5y^2 - 16x - 30y - 9 = 0$$

What is the standard form of the equation of the conic given above?

A $\frac{(x-4)^2}{11} - \frac{(y-3)^2}{4} = 1$

B $\frac{(y+3)^2}{4} - \frac{(x-2)^2}{5} = 1$

C $\frac{(y-3)^2}{6} - \frac{(x+2)^2}{9} = 1$

D $\frac{(x-4)^2}{11} + \frac{(y-3)^2}{4} = 1$

CST00146

52 **Which statement describes the graph of the equation $x^2 + y^2 + 4x - 6y - 3 = 0$?**

A a hyperbola with center $(-2, 3)$ and vertices $(4, -3)$ and $(-4, 3)$

B a hyperbola with center $(-2, 3)$ and vertices $(2, -3)$ and $(3, -2)$

C a circle with center $(-2, 3)$ and radius 8

D a circle with center $(-2, 3)$ and radius 4

CST20127

53 **What is the solution to the equation $5^x = 17$?**

A $x = 2$

B $x = \log_{10} 2$

C $x = \log_{10} 17 + \log_{10} 5$

D $x = \dfrac{\log_{10} 17}{\log_{10} 5}$

CST00132

54 **If $\log_{10} x = -2$, what is the value of x ?**

A $x = -\sqrt{\dfrac{1}{10}}$

B $x = \sqrt{\dfrac{1}{10}}$

C $x = \dfrac{1}{100}$

D $x = 100$

CST10255

55 **Which equation is equivalent to $\log_3 \dfrac{1}{9} = x$?**

A $\left(\dfrac{1}{9}\right)^3 = x^3$

B $\left(\dfrac{1}{9}\right)^3 = x$

C $3^x = \dfrac{1}{9}$

D $3^{\frac{1}{9}} = x$

CST10151

56 **If $\log_x y = 2$, which of the following is true?**

A $y = x^2$

B $y = 2x$

C $x = y^2$

D $x = 2y$

CST00516

57 **Which is the first *incorrect* step in simplifying $\log_4 \dfrac{4}{64}$?**

Step 1: $\log_4 \dfrac{4}{64} = \log_4 4 - \log_4 64$

Step 2: $= 1 - 16$

Step 3: $= -15$

A Step 1

B Step 2

C Step 3

D Each step is correct.

CST00517

58 **Jeremy, Michael, Shanan, and Brenda each worked the same math problem at the chalkboard. Each student's work is shown below. Their teacher said that while two of them had the correct answer, only one of them had arrived at the correct conclusion using correct steps.**

Jeremy's work

$$x^3x^{-7} = \frac{x^3}{x^{-7}}$$
$$= x^{10}, x \neq 0$$

Shanan's work

$$x^3x^{-7} = \frac{x^3}{x^7}$$
$$= \frac{1}{x^4}, x \neq 0$$

Michael's work

$$x^3x^{-7} = \frac{x^3}{x^{-7}}$$
$$= x^{-4}, x \neq 0$$

Brenda's work

$$x^3x^{-7} = \frac{x^3}{x^7}$$
$$= x^4, x \neq 0$$

Which is a completely correct solution?

A Jeremy's work

B Michael's work

C Shanan's work

D Brenda's work

CST10301

59 **A student showed the following steps in his solution of the equation below, but his answer was not correct.**

$$\log_5(2x^2 - 3x + 1) - \log_5(x - 1) + \log_5 125 = 6$$

Step 1: $\log_5(2x - 1)(x - 1) - \log_5(x - 1) + 3 = 6$

Step 2: $\log_5(2x - 1)(x - 1) - \log_5(x - 1) = 3$

Step 3: $\log_5(x - 1) = 3$

Step 4: $x - 1 = 125$

Step 5: $x = 126$

In which step did he make his first error?

A Step 1

B Step 2

C Step 3

D Step 4

CST10336

60 **Which is the first *incorrect* step in simplifying $(x^2)^3 - (x^5)^{-1}$?**

Step 1: $(x^2)^3 - (x^5)^{-1} = x^6 - x^{-5}$

Step 2: $= x^6 - \frac{1}{x^5}$

Step 3: $= \frac{x^6}{x^5}$

Step 4: $= x$

A Step 1

B Step 2

C Step 3

D Step 4

CST00139